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**Declaration under Rule 4.17:**

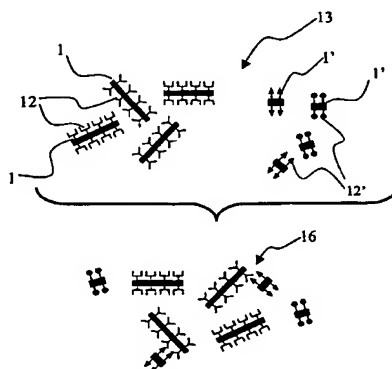
— of inventorship (Rule 4.17(iv)) for US only

**Published:**

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— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: SYSTEM AND METHOD FOR SOLUTION BASED MULTIPARAMETER ANALYSIS OF ANALYTES



(57) Abstract: There is described a system for multiparameter analysis of analytes. The system comprises: 1) primary supports (1) with a largest dimension (3) of 500  $\mu\text{m}$  or less suspended in use in a fluid solution; 2) each primary support (1) comprises an identification means (2) for identification thereof; 3) at least one primary analyte (12) is bound to each primary support (1); 4) a secondary analyte (12') is suspended in use in the fluid solution; and 5) a measuring means (25) is arranged in communication with the fluid solution for monitoring interaction between the primary analyte (12) and secondary analyte (12'). The system is distinguished in that: 6) secondary supports (1') with a largest dimension at the most the same size as the largest dimension (3) of the primary supports (1) are suspended in use in the fluid solution; 7) each secondary support (1') comprises an identification means (2') for identification thereof; 8) at least one secondary analyte (12') is bound to each of the secondary supports (1'); and 9) the measuring means (25) is arranged to detect any post-reaction interaction between one or more primary analyte (12) and one or more secondary analyte (12') by detecting the identification means (2, 2') of the primary and secondary supports (1, 1') attached thereto. There is also described a method of multiparameter analysis of analytes using the system.



WO 2004/011940 A1

**WO 2004/011940 A1**



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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

# INTERNATIONAL SEARCH REPORT

Internat Application No  
PCT/GB 03/03268

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 G01N33/543 G01N33/58

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 G01N B01J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, EMBASE, BIOSIS

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 00 16893 A (ENGLAND JAMES ; COLBY EDWARD (GB); DAMES ANDREW (GB); SENTEC LTD (G) 30 March 2000 (2000-03-30) the whole document	1-15
Y	WO 01 25002 A (NATAN MICHAEL J ; MALLOUK THOMAS E (US); PENN STATE RES FOUND (US)) 12 April 2001 (2001-04-12) the whole document	1-15
Y	WO 02 42736 A (RAVKIN ILYA ; GOLDBARD SIMON (US); HYUN WILLIAM C (US); VIRTUAL ARR) 30 May 2002 (2002-05-30) the whole document	1-15
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
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- \*O\* document referring to an oral disclosure, use, exhibition or other means
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- \*&\* document member of the same patent family

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 02 01228 A (MINERVA BIOTECHNOLOGIES CORP) 3 January 2002 (2002-01-03) in particular pages 26-28; Figure 27 the whole document ----	1-15
Y	US 6 361 950 B1 (MANDECKI WLODEK) 26 March 2002 (2002-03-26) abstract ----	10
Y	US 2001/034034 A1 (DANIELS R HUGH ET AL) 25 October 2001 (2001-10-25) in particular figure 1C the whole document -----	1-15

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/GB 03/03268

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 16, 17  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:  
see FURTHER INFORMATION sheet PCT/ISA/210
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

Continuation of Box I.2

Claims Nos.: 16,17

The expression "substantially as hereinbefore described with reference to one or more of Figures 1-9b" is vague and unclear and does not clearly define the subject-matter for which protection is sought. Therefore, no meaningful search can be carried out for the subject-matter of these claims.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 03/03268

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0016893	A	30-03-2000	AU 6101399 A DE 69904754 D1 DE 69904754 T2 DK 1133352 T3 EP 1133352 A2 WO 0016893 A2 JP 2002526755 T	10-04-2000 06-02-2003 17-07-2003 22-04-2003 19-09-2001 30-03-2000 20-08-2002
WO 0125002	A	12-04-2001	AU 1495101 A AU 7746200 A AU 7844800 A CA 2386047 A1 CA 2386165 A1 CA 2387992 A1 EP 1222609 A1 EP 1227929 A1 EP 1238125 A1 JP 2003529128 T JP 2003511556 T JP 2003511675 T WO 0125002 A1 WO 0126038 A1 WO 0125510 A1 US 2003209427 A1 US 2002104762 A1	10-05-2001 10-05-2001 10-05-2001 12-04-2001 12-04-2001 12-04-2001 17-07-2002 07-08-2002 11-09-2002 30-09-2003 25-03-2003 25-03-2003 12-04-2001 12-04-2001 12-04-2001 13-11-2003 08-08-2002
WO 0242736	A	30-05-2002	AU 3977502 A WO 0242736 A2 US 2003008323 A1 US 2003129654 A1 US 2003134330 A1 US 2003166015 A1 US 2003207249 A1	03-06-2002 30-05-2002 09-01-2003 10-07-2003 17-07-2003 04-09-2003 06-11-2003
WO 0201228	A	03-01-2002	AU 7014001 A CA 2413932 A1 EP 1309858 A2 WO 0201228 A2	08-01-2002 03-01-2002 14-05-2003 03-01-2002
US 6361950	B1	26-03-2002	US 6001571 A AU 1141597 A CA 2238696 A1 EP 0871777 A1 JP 2000502887 T WO 9720074 A1 US 6051377 A	14-12-1999 19-06-1997 05-06-1997 21-10-1998 14-03-2000 05-06-1997 18-04-2000
US 2001034034	A1	25-10-2001	US 6274323 B1 AU 4701200 A CA 2373146 A1 EP 1179185 A1 JP 2002544488 T WO 0068692 A1 US 2001055764 A1	14-08-2001 21-11-2000 16-11-2000 13-02-2002 24-12-2002 16-11-2000 27-12-2001